

IN THE CLAIMS

What is claimed is:

- 1 1. A method of forming a seed layer comprising:
2 forming a non-continuous metal layer within a recess in a substrate;
3 activating the non-continuous metal layer and at least one of a non-
4 deposited region within the recess; and
5 electrolessly depositing a seed layer on the non-continuous metal
6 layer and on the at least one non-deposited region within the recess.

- 1 2. The method of claim 1 wherein forming the recess comprises forming
2 a high aspect recess comprising an aspect ratio greater than about 3:1.

- 1 3. The method of claim 1 wherein forming the non-continuous metal
2 layer comprises forming a non-continuous layer of at least one of tantalum,
3 tantalum nitride, tantalum silicon nitride, tungsten, titanium, titanium
4 tungsten, titanium nitride, titanium silicon nitride or a combination thereof.

- 1 4. The method of claim 1 wherein activating the non-continuous metal
2 layer and the at least one non-deposited region within the recess comprises
3 forming an activation layer on the non-continuous metal layer and on the at
4 least one non-deposited region within the recess.

1 5. The method of claim 4 wherein activating the non-continuous metal
2 layer and the at least one non-deposited region within the recess comprises
3 forming at least one of a palladium or platinum layer on the non-continuous
4 metal layer and the at least one non-deposited region within the recess.

1 6. The method of claim 1 further comprising forming a metal fill layer on
2 the seed layer.

1 7. The method of claim 6 further comprising polishing the metal fill layer
2 by utilizing a chemical mechanical polishing process.

1 8. The method of claim 6 wherein forming the metal fill layer comprises
2 forming a substantially void free metal fill layer.

1 9. A method of forming a microelectronic structure comprising:
2 forming a recess in a substrate;
3 forming a non-continuous metal layer within the recess;
4 activating the non-continuous metal layer and at least one non-
5 deposited region within the recess;
6 electrolessly depositing a seed layer on the non-continuous metal
7 layer and on the at least one non-deposited region within the recess; and
8 forming a metal fill layer over the seed layer.

1 10. The method of claim 9 wherein forming the recess comprises forming
2 a high aspect recess comprising an aspect ratio greater than about 3:1.

1 11. The method of claim 9 wherein forming the non-continuous metal
2 layer comprises forming a non-continuous layer of at least one of tantalum,
3 tantalum nitride , tantalum silicon nitride, tungsten, titanium, titanium
4 tungsten, titanium nitride, titanium silicon nitride or a combination thereof.

1 12. The method of claim 9 wherein electrolessly depositing the seed layer
2 comprises electrolessly depositing a copper layer comprising a grain size of
3 about 1 micron in diameter or greater.

1 13. The method of claim 9 wherein forming the metal fill layer comprises
2 electroplating a metal fill layer.

1 14. The method of claim 9 wherein forming the metal fill layer comprises
2 forming a substantially void free metal fill layer.

1 15. The method of claim 9 wherein forming the metal fill layer comprises
2 electroplating a copper layer.

1 16. A microelectronic structure, comprising:
2 a recess in a substrate;
3 a non-continuous metal layer disposed within the recess;
4 a seed layer disposed on the non-continuous metal layer and on at
5 least one non-deposited region within the recess; and
6 a metal fill layer disposed on the seed layer.

1 17. The structure of claim 16 wherein the seed layer comprises a grain
2 size of about 1 micron in diameter or greater.

1 18. The structure of claim 16 wherein the non-continuous metal layer
2 comprises at least one of titanium, tantalum, tantalum nitride, tantalum
3 silicon nitride, tungsten, titanium, titanium tungsten, titanium nitride, titanium
4 silicon nitride or a combination thereof.

1 19. The structure of claim 16 wherein the seed layer comprises copper.

1 20. The structure of claim 16 wherein the recess comprises a high aspect
2 ratio recess, wherein the high aspect ratio comprises an aspect ratio greater
3 than about 3:1

1 21. The structure of claim 16 wherein the metal fill layer comprises a

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2 substantially void free metal fill layer.